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FORTY-FIFTH

Annual Report

OF THE

BOARD OF MANAGERS

OF THE

MONONGAHELA NAVIGATION CO.

TO THE

Stockholders with Accompanying Documents.

PRESENTED JANUARY 8, 1885.

PITTSBURGH, PA.
SMITH BROTHERS, FRANKLIN PRINT, 510 SMITHFIELD STREET, OPPOSITE CITY HALL.
1885.

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President.

M. K. MOORHEAD.

Secretary and Treasurer.

WM. BAKEWELL.

Managers.

JOSEPH ALBREE,
ALEXANDER BRADLEY,
FELIX R. BRUNOT,
A. C. BAKEWELL,
JOHN HARPER,
GEO. B. LOGAN,
J. B. MURDOCH, M. D.
J. B. MOORHEAD,
A. E. W. PAINTER,
J. B. SWEITZER.

FORTY-FIFTH ANNUAL REPORT

—OF THE—

Board of Managers of the Monongahela Navigation Company.

To the Stockholders of the Monongahela Navigation Company:

At your last annual gathering on the 10th day of January, 1884, the venerable president of this company was prevented by sickness from participating in your meeting, for the first time for a long series of years, and it was understood that grave apprehensions were entertained that his long and useful life was drawing to a close. Before your adjournment on that occasion you adopted the following resolutions:

"*Resolved*, That the absence from the meeting of the HON. J. K. MOORHEAD, who for thirty-seven years has so efficiently and acceptably filled the office of President of the Monongahela Navigation Company, together with the cause of his absence, is the occasion of sincere regret to the stockholders."

"*Resolved*, That we tender our warmest sympathy to General Moorhead in his illness, and express our sincere hopes that he may soon recover health and strength for the resumption of his usual avocations."

The hope thus expressed was not to be realized, for it was only a few weeks after that meeting when he peacefully departed this life on the sixth day of March.

The death of one who was so well known and universally respected was a great loss to the community, but especially so to this company with which he had been intimately identified for so many years, and which largely owed its continued existence and its prosperity to his sagacity and untiring energy. It is eminently fitting, therefore, that we should briefly review the history of the company during the time of his connection with it.

The Monongahela Navigation Company was organized on the tenth day of February, 1837. Owing to certain serious omissions and restrictions in the charter of the company it was deemed inadvisable to prosecute the work until an amendment should be procured from the legislature, which was obtained on the 24th of June, 1839. The chief difficulty in the original charter had been that the lift of the locks was restricted to 4½ feet, which would have required the building of so many locks and dams as to have caused serious and unnecessary delay in the navigation of the river.

General Moorhead's first connection with this company took place on the 17th of December, 1839, when he and his brother, J. B. Moorhead, who is now a member of your Board of Managers, entered into a contract with this company for the erection of Lock and Dam No. 1; and in January of the ensuing year they commenced active operations on the work, which was under the superintendance of the late W. Milnor Roberts, as Chief Engineer, the father of the present engineer of the company. This lock and dam, together with Lock and Dam No. 2, were completed and opened for navigation in October, 1841.

On July 15th, 1840, a contract was made for the erection of Locks and Dams Nos. 3 and 4. The importance of the improvement thus commenced, not only to the manufacturing interests of the City of Pittsburg, and to the towns and villages on the Monongahela river, and to the owners of coal property on its banks, can hardly be estimated, but some idea of the vast change which has been wrought by this slackwater improvement may be had by recalling the fact that during the year 1857 there was not at any time sufficient water in the river to permit of flat boats carrying 5,000 bushels of coal being floated down to the Ohio river; and that about 750,000 bushels of coal covered the entire annual trade of the river in that important article. When, therefore, we consider that the present annual out-put of coal from the Monongahela Valley, nearly all of which passes over this improvement, amounts to about one hundred millions of bushels in a single year, and that this product is rendered possible only by the facility thus afforded for bringing it to market; and the enormous appreciation in value of coal lands bordering on the river for a distance of $90\frac{56}{100}$ miles to the Virginia State line, we can form some estimate of the incalculable advantage which has accrued to this section of the country by the construction of the works of this company. The coal trade, which has gradually developed to its present enormous proportions, owes its very existence to this improvement, and very largely to the skill, energy and devotion of our lamented president.

So immediate was the effect of the completion of these two locks and dams on the coal business that in eight weeks after the locks were opened for the passage of boats over a million and a quarter of bushels of coal passed through Lock No. 1.

A period of disaster, however, soon followed the opening of the work. Between the years 1842 and 1845 the company lost over $100,000 by the failure of the United States Bank, which was one of its stockholders, and by the depreciation of the bonds of the State of Pennsylvania to 50 cents on the dollar. The company was heavily in debt owing to these losses, and was utterly unable to carry on the work of the third and fourth locks and dams, or even to make the necessary repairs to the work, and with difficulty prevented the entire improvement being sold by the sheriff. To add to these misfortunes, in July, 1843, a breach occurred in Dam No. 1, which cut off all revenue from the improvement at that point; and the entire river sweeping through the gap, deepened and widened the breach until it seemed to be almost impossible to save the work from destruction. The stock of the company was sold at three dollars a share, and utter ruin stared the company in the face. It was no wonder that the public lost confidence in the permanence of such an improvement, as engineering work of that character and extent were then scarcely known, and it was supposed by many, that it was useless to attempt to confine a river by dams, which was liable, as is the Monongahela, to be swollen by such freshets as frequently occur. The repair of the work was a perilous undertaking, as the river had been washed out at the breach in Dam No. 1, to a depth of nearly forty feet.

In this emergency it required a man to have a great deal of confidence in the possibilities of engineering skill, and the possession of a large public spirit to attempt to rescue the improvement from its impending ruin, and had it not been for General Moorhead and a few other citizens of Pittsburg, such would have been its fate. These gentlemen, of whom General Moorhead was the leading spirit, proposed to the company to enter into a contract to repair the breach in Dam No. 1, and to finish Locks and Dams 3 and 4 (the work on which when about one-third done, had been suspended in the year 1841) so as to furnish slackwater navigation up to Brownsville, a distance of a little over 52 miles. This contract was made on November 9th, 1843, the association of Moorhead, Robertson & Co., agreeing to take the bonds of the company in payment; they also agreed to apply the tolls received to the payment of the debts of the company, before appropriating any part of the revenue to the payment of the principal or interest on their bonds. As soon as spring opened they commenced to collect materials for the work, and although they were seriously delayed by a succession of freshets in the river, so that they could not commence the work of construction until July, 1844, they performed the astonishing feat of filling up the gap in Dam No. 1, completing two locks and dams (Nos. 3 and 4) and putting the entire works in good repair in the short period of four months.

For the rapid and successful completion of this undertaking, large credit is due to Sylvanus Lothrop, the engineer of the company, and to Mr. J. B. Moorhead who had the active superintendency of the work in behalf of the contractors; but to the practical knowledge and indomitable energy of General Moorhead this company is chiefly indebted for the very existence of the improvement at the present day. Had it not been for him, it is very improbable that any capitalists would have been found willing to risk their fortunes in a work, the success of which was so problematical. As an evidence of this it may be stated that these gentlemen who undertook this work were largely induced to do so by the fact that a prominent and well-known contractor of large experience was willing to embark with them in their undertaking, and had engaged to do so, but that when he came to Pittsburg and inspected the improvement, he was so discouraged by its condition, and especially by the terrible breach in the dam, that he offered to sacrifice what he had already invested, advised the abandonment of the contract, and utterly refused to have anything more to do with it. In this emergency General Moorhead displayed his characteristic soundness of judgment and his public spirit: he promptly secured another gentleman to purchase the interest of the disheartened contractor, and thus secured the carrying out of their project.

The completion of the improvement to Brownsville, a distance of over 55 miles, left the company heavily in debt. The amount of the capital stock of the company was very little over a quarter of a million of dollars, while the cost of construction was very nearly double that sum. For obvious reasons it was impossible to obtain new subscriptions to the stock of the company, while the old stock was considerably below par in the market, and the stability of the works was yet unproved. But as the coal trade on the river had increased very considerably, amounting then to over nine millions of bushels per annum, the company determined to meet the demand for greater lockage accommodations by building a second lock at the first Dam. The company being still in debt over two hundred and fifty thousand dollars, they were obliged to make a contract for the new lock payable in bonds. This they succeeded in effecting, and in the year 1847 the new Lock No. 1 was commenced. It was on the 1st July of the preceding year that the official connection of General Moorhead commenced, by his election to the presidency of the company, to fill the vacancy caused by the resignation of Major John B. Butler, who had been appointed paymaster to the army in the war with Mexico.

As the debt of the company, irrespective of this new work, exceeded the amount of capital stock, it was obvious that the prospect of the stockholders receiving any return on their invest-ment was very remote: but in making these arrangements their interests were not overlooked. As stated in the president's report in January, 1849, permission was obtained from the Legislature to duplicate the stock in the hands of the stockholders, and credit them as instalments thereon with the amount paid from the earnings in liquidation of the outstanding bonds, and in the construction of the new work. But even when this was accomplished, the amount of the duplicate stock fell far short of the actual cost of the improvement.

In the year 1851 a serious leak was discovered in the second lock, which seriously impeded the navigation at that point, owing to the consequent difficulty and delay in operating the lock. As this difficulty could not be removed without closing the lock and entirely preventing the passage of coal to Pittsburg and the lower rivers, and as the increase of the coal trade seemed to warrant increased facilities at that point, the president recommended the construction of another lock at that dam, which, when completed, would permit of the complete repair of the old lock, and after that furnish double lockage to the second pool, as was already the case at the first. Accordingly, in the fall of 1852 the second lock at Dam No. 2 was put under contract. To meet this emergency a fresh issue of bonds was necessary, and the new work was successfully completed during 1854.

The completion of the work to Brownsville and the duplication of the lockage facilities at the first and second dams having thus been effected, the Board of Managers turned their attention to the extension of the improvement to the Virginia State line, a distance of about 35 miles from Brownsville.

The fall of the Monongahela river above Brownsville, being about 15 inches to the mile, while between Brownsville and Pittsburg it is only about 7 inches, rendered it advisable to increase the lift of the locks on the upper river, which would make the work proportionately more costly. The company was still very considerably in debt, and it was accordingly determined to make another effort to obtain fresh subscriptions to the capital stock to enable the proposed extension to be made. The effort was accordingly made in the year 1853, but it was found that while the inhabitants of the counties bordering on the river above Brownsville were extremely anxious to have the navigation extended, they were not willing to invest their money in the stock of the company to construct the additional locks and dams. These efforts having almost entirely failed, the only resource which was left to the Board of Managers was to resort to their old expedient of issuing bonds. They endeavored to let the contract for two locks above Brownsville on the terms of payment of one-third in cash, one-third in bonds, and one-third in the stock of the company, but no one was found willing to accept a contract on these terms. They had only just commenced to pay dividends, having in July, 1853, declared their first dividend on the stock of two dollars a share. They therefore found themselves shut up to the course of discontinuing the payment of dividends and applying all the net earnings to the construction of the new work, the contractors agreeing to take payment of one-third in the stock or bonds of the company.

About the year 1855 an important change occurred in the mode of carrying coal; the old fashioned flat boats were displaced by barges of much greater capacity, which were towed by steamboats, built expressly for that purpose. In that year the annual out-put of coal had reached the amount of twenty-two millions of bushels, an increase of over five fold since the navigation was reopened with four locks in the year 1845.

The year 1856 was a very disastrous one for the company. In May a breach occurred in Dam No. 2, about two hundred feet being swept away. Prompt measures were taken to repair the dam, but during the remainder of the year up to 1st December, the river was so low that there was at no time a sufficiency of water, either in the Monongahela or Ohio, to float coal barges. The work on the Locks and Dams Nos. 5 and 6 was completed in the fall, but the pools did not fill until the first of December, and the river was closed by ice on the 20th of that month. The out-put of coal during that year fell to eight and a half millions of bushels.

In order to compensate the stockholders for the deprivation of all income from their stock, caused by the application of the entire net revenues of the company after paying for the necessary expenses and repairs, to the construction of new work, the Legislature had passed an Act in the year 1854 authorizing the company to declare dividends in stock to the amount of all money expended, out of the earnings, in the construction or extension of the improvement.

It is under the provisions of this Act that the company are now declaring dividends of capital stock to the stockholders. It will be noticed that the new stock thus issued represents money actually expended in the improvement, and is not in any sense what is commonly known as "watered stock," and the result of its issue is gradually to approximate the amount of capital stock to the cost of construction.

In the month of May, 1858, the works of the company withstood the test of the greatest freshet that had occurred for several years, all the locks being entirely submerged, without any apparently serious damage: but during the ensuing year it became evident that the foundation of the fifth dam was impaired, and though immediate measures were taken to save it, a part of the dam and the crib outside of the lock were swept away, requiring an expenditure of about $14,000 to repair the damage. Again in the winter of 1866–7 an immense ice gorge formed in the river, which, when the break-up came, swept over the dams with crushing force, doing so much injury as to swell the amount expended in repairs during the years 1867 and 1868 to nearly one hundred thousand dollars.

When these repairs had been completed a careful examination was made of the work, and it was considered to be in an excellent condition. The succeeding winter of 1867–8 was an unusually cold one, and the ice formed rapidly on the river and to a great thickness. In order to prevent, if possible, the disaster anticipated from the breaking up of the heavy ice in the spring, the coal men resorted to the expedient of keeping the ice in the second pool broken up by running steamboats up and down. This caused a constant passage of large cakes of broken ice over the dams, which tore up the sheeting of the lower slope of the dams, so that when the general break-up occurred and the water became high, the lower cribs of Dam No. 2 were undermined and emptied of stone, especially at the end of the dam nearest to the lock. The water was then too high to permit of any measures being taken to save the dam, and on the 22d May, 1868, that portion of the dam broke away, leaving a gap of about three hundred feet in length.

In the year 1876 a successful experiment was made of utilizing the water power at Dam No. 3 to operate machinery for opening and closing the gates and assist the ingress and egress of heavily laden boats into and out of the lock, an improvement which in the following year was put in operation at locks Nos. 2 and 4.

Another serious ice freshet occured in January, 1877, which did serious damage to coal tipples on the banks of the river, and swept away coal boats and barges and everything movable which opposed its course. The locks were all submerged to a depth varying from 7 to 16 feet, and yet no serious damage was done, excepting to lock houses, capstans and machinery at the locks, which were carried away: but the locks and dams themselves were comparatively uninjured.

Experience having shown the importance of the promptest measures being taken to repair any leaks or other defects occurring from time to time in the locks, the company in the year 1879 constructed a pumping boat by means of which the locks could be pumped out, and repaired sooner and with greater rapidity and efficiency.

It is the uniform practice of the company to take advantage of the annual occurrence of the usual period of low water in the river to make a careful examination of the locks and dams, each year, and to put them in the best possible condition to withstand the autumnal floods and the ice freshets which occur when the ice on the river, which, owing to the comparative stillness of the water in the pools, forms oftentimes to a great thickness, breaks up in the spring; but the utmost care, as our experience has shown, will not avert disaster from these causes. The winter of 1880–1 was a remarkably cold one, and the ice formed in the pools was of an unusual thickness. In order to avert the threatened damage to their coal works, the coal operators proposed to break up the ice artificially, and cause it to pass over the dams before the natural break up should occur. They consulted General Moorhead in regard to the matter, but he strongly urged them to desist from the attempt, giving it as his opinion, based on the experience of previous years, and especially on that of the winter of 1867–8 when a similar expedient had been resorted to, that the passage of the large cakes of broken ice, when the water was comparatively low, would tear off the sheeting from the dams, at a time when it would be impossible to repair the damage, and expose them in a denuded condition to the action of the ice flood whenever the break up should naturally occur. The protest of your president did not, however, deter them from carrying out their plan, and the result was as he had predicted; 160 feet of Dam No. 3 was torn off down to the square, which soon resulted in a breach in the dam which could not be stopped until it reached the width of 150 feet and a depth of 35 feet. A similar result was experienced at Dam No. 1, the break there being about the same in length and of rather greater depth than that at Dam No. 3. As might be expected, the amount expended for repairs during that year was greatly augmented, reaching to the sum of eighty thousand dollars.

The charter of the company required them to commence the construction of Lock and Dam No. 7 in such manner and at such time as to complete it simultaneously with the completion of the work extending the slackwater navigation to Morgantown, Va. The U. S. Government having constructed Lock and Dam No. 9 at Hoard's Rock in Virginia, called upon this company for assurances of their intention and ability to construct and complete Lock and Dam No. 7, before the government would commence the construction of Lock and Dam No. 8, which was necessary to make the connection between the slackwater improvement in Virginia and that of this company in Pennsylvania. This assurance was given to the Secretary of War, and this company immediately set about making provisions for funds wherewith to construct this work. They also, appreciating the need for further lockage accommodations at Dam No. 3, determined at the same time to duplicate the lock at that point, as had already been done at Locks No. 1 and 2. For this purpose a special meeting of the stockholders was held in March, 1882, which authorized an increase of the capital stock of the company by the addition of ten thousand shares, and a loan of half a million of dollars on bonds, the amount expended from time to time in payment of these bonds to be distributed in stock until the ten thousand shares should be thus fully paid up. The bonds thus authorized were executed in July, 1882, and are being issued whenever necessary for the payment of the cost of the new work.

As these bonds are paid off, from time to time, out of the net earnings of the company, the amount so applied, which would otherwise be appropriated to dividends in cash to the stockholders, is issued to them in stock, under the provisions of the act of January, 1854, before referred to, so that every share of stock thus issued represents that amount of cash paid on the bonds issued for the construction of the new work.

The great pressure on the works for lockage accommodation occurs, of course, at Lock No. 1, which has to pass all the through trade of the entire river. In order to meet, if not to anticipate, the demands of the coal business at that point, your Board of Managers took into serious consideration the construction of a chute in Dam No. 1, consisting in fact of a gap in the dam, filled by leaved gates, which might be raised when the water in the river was not sufficient to permit of its being opened, but which on being lowered would leave a free and unobstructed water way for craft of all descriptions, and especially for coal barges and their tow boats from the pool of Dam No. 1 to the level of the river below.

Although the construction of such a chute was an untried experiment, and a very costly one, yet the great advantage which it would prove, if successful, to those who were engaged in the coal business, from which the company must always expect to derive its chief revenues, seemed to warrant the trial; the more so as this matter had been specially examined and reported upon by two U. S. Engineers, General Weitzel and Colonel Merrill, who reported in 1873 that they "concluded it was perfectly practicable to cut down a dam to a depth of four feet and width of two hundred feet, and to open or close the opening thus made by means of a peculiarly shaped gate; and that with suitable guide walls at the head, and a long inclined plane below, coal fleets could be passed through this opening with ease and safety."

General Moorhead at that time offered to the Government the use of Dam No. 1 in which to try the experiment, provided that one-half of the expense should be borne by the company, the work when finished to belong to them. This offer, however, though recommended for adoption by the Government Engineers, was not accepted.

A contract was accordingly entered into in the year 1882 with Mr. John Dubois for the erection of a chute of 120 feet width in Dam No. 1, on a plan patented by him, the company agreeing to construct the foundation and guide cribs, under the direction of Mr. Dubois, and the chute to be built and put in successful operation by him.

The result of this experiment has proved to be unfortunate, as stated in our last annual report, and the hopes therein expressed that the apparatus might yet prove a success and fulfill the expectations of its construction have not been realized.

The condition of the cribs of the chute was such that apprehensions were entertained that they might be carried away by the ice or floods during the winter and do permanent injury to the dam. Accordingly the board had the work examined by a couple of skillful engineers, who reported that it would not be safe to leave the chute in that condition any longer, and recommended that as a measure of protection to the company, as well as to those who navigate the river, the gap in the dam be permanently closed, and one of the cribs taken down to the level of the square of the dam. Mr. Dubois was notified of the intention of the company so to do, unless he proceeded immediately to put the chute in good working condition, but failed to respond in any way. The amount expended by the company in putting in the foundations and guiding cribs has been considerable; it was not, however, incurred without due deliberation, and the failure of the experiment is a source of deep regret to your board, as it was hoped that it might have proved a substantial benefit to the coal trade.

It is expected, however, that when the Davis Island Dam shall be in operation, affording at all times a sufficient depth of water in the harbor at Pittsburg for coal boats to pass through Lock No. 1, so as to be in readiness to pass down the Ohio, the two locks at that point will prove amply sufficient for the purposes of convenient and rapid transit over and out of the slackwater improvement.

About the close of the year 1881 the contract for the erection of the seventh lock and dam were entered into, and in February, 1882, a contract was also made for the construction of a duplicate lock at Dam No. 3. One of the contractors for this lock died within five months after undertaking this work: his partner then abandoned the contract: so that the company after carrying it on for a while under the superintendance of their engineer, relet the work to the same contractors who were constructing Lock and Dam No. 7. Both these works are now finished, and are in good working order. The completion of Lock and Dam No. 7, fulfills the charter obligations of the company as to the extension of improvement; and whenever the U. S. Government shall have completed the eighth lock and dam which they have undertaken to construct, there will be a continuous slackwater navigation from Pittsburg to Morgantown, in West Virginia.

From this brief sketch of the history of this improvement, it will be seen that its success has depended largely upon the constant care and watchfulness of our lamented president. His long continued connection with this improvement, extending over a period of forty six years, gave him a large experience, such as no one else in the United States possessed, and when we add to this consideration his untiring devotion to the interests not only of the Monongahela Navigation Company, but also of the public who used this improvement, it will be seen how incalculable is the loss which we have sustained by his removal from our midst.

His first annual report to the stockholders was presented on January 4th, 1847, and the annual reports to the stockholders prepared by him during thirty-seven successive years, are a very valuable contribution to the literature of engineering.

It will be very obvious, from what we have stated, that the security and permanence of such an improvement as ours depends almost entirely on the untiring watchfulness of those who have charge of the works, and the immediate repairing of any damage or threatened damage which may occur. Nearly one million of dollars has been expended by the company in repairs since the improvement was opened for navigation, the annual average during the last ten years being about $35,000.

Another interesting fact in connection with this improvement is the large increase of the coal product of the Monongahela Valley. The out-put of coal from four pools in 1845 was a little over four and a half millions of bushels, while during the past year it has been nearly eighty-two millions of bushels; and the total amount of coal and coke which has passed over the navigation since it was opened is over one billion six hundred and fifty millions, or more exactly 1,650,566,063 bushels.

Your board, in carrying out their constant purpose of supplying all possible facilities for the navigation of the Monongahela River, have this day entered into a contract with Messrs. Drake & Stratton for the construction of a duplicate lock at Dam No. 4. When this shall be completed, the amplest accommodation will be furnished for the passage of coal and other freight.

The amount of tolls receiving during the past year was $207,202.97, a falling off in the receipts from those of the previous year of $71,820.59, which has been caused largely by the decrease in the amount of coal product as compared with that of the previous year. The amount of coal and coke passing over the improvement was—

in 1883, - 112,395,389 bushels.
in 1884, - 81.706,852 "

A decrease of 30,688,537 "

Before closing this report, we would call attention to the fact that the toll charged on coal, which constitutes the largest part of the revenue of the company, bears a very inconsiderable proportion to the value of the product, as the average toll during the past year is only $\frac{172}{1000}$ of a cent a bushel, or 4½ cents a ton.

We are happy to be able to state that all the locks and dams of the company are in good condition ; a large amount ($55,683.24) having been spent during the past year in repairs. With the addition of the new locks (one of which is about to be constructed) and the new dam (No. 7), this item of expenditure may be expected to be considerably larger than in former years: but it is surely well spent, as any delay or hesitation in promptly expending whatever may be deemed necessary to keep up the tone of the improvement would result in far greater loss both to the company and to those who navigate the river.

To the annual report of Thomas McGowan our efficient superintendent of repairs, we refer for details of the work of this description executed during the past year; merely adding that the company have built a new repair boat, furnished with steam power, so as to be able to move speedily to any point of the river where any work may need to be done.

The Treasurer's Report shows financial condition of the company, and the report of the Cargo Inspector gives an interesting statement of the products of the Monongahela Valley which find their avenue to the Pittsburg and lower river markets over this channel.

The various employees of the company continue, as in former years, to render satisfactory and efficient service.

Respectfully submitted,

By order of the Board of Managers,

M. K. Moorhead, *President.*

Pittsburg, Jan. 8, 1885.

Report of Superintendent of Repairs.

M. K. MOORHEAD, Esq., Pres't Monongahela Navigation Co.

Dear Sir—I respectfully submit the following report:

During the past year the works of the company have suffered no serious injury, yet the expenditures for ordinary repairs has been heavy, owing in part to the character of the old work, much of which it has become necessary to renew, and partly to the addition of the second Lock at No. 3, and of Lock and Dam No. 7, and the substitution of machinery on all the locks below Brownsville for the purpose of working the gates and facilitating the passage of crafts through the locks. The latter, while absolutely necessary, and accomplishing the purpose intended, when not handled with proper care and judgment, adds much, and frequently unnecessarily, to the cost of keeping the locks in order and repair.

Lock No. 1.—One new gate was built and placed in the lower end of the river wall of the small lock. Both gates at the upper end of the large lock were docked. Three new posts, and some new arms and wickets were supplied, besides the plank and irons used in repairing. The ice-breaker also was repaired.

The lower slope of nearly one-half of the dam at the south end was raised, filled with stones, and covered with new sheeting.

Early in the season, in consequence of a failure to get the Dubois Dam raised when necessary to do so, in order to retain sufficient water in the pool, a coffer dam had to be placed temporarily across the opening in the dam for that purpose. Later in the season when the river got low, the condition of the Dubois structure was found to be such that if not put in substantial working condition before winter, the main dam would be seriously endangered. There being no effort made on the part of Mr-

Dubois to accomplish this desired object, the opening in the main dam was permanently closed late in the fall.

The usual amount of dredging necessary to keep the channel clear, was done during the season.

Lock No. 2.—The upper end of the middle and river walls of the old lock were taken partly down, rebuilt and covered with new coping. The upper end of the ice breakers was built anew, the dam filled with stone, and new sheeting put on where it was needed; a protection crib was built in front of the dam abutments above the comb of the dam, extending up and connecting with the shore above, and filled with gravel to prevent the water from getting around and through the old abutment. As at No. 1, the usual amount of dredging was done to remove deposits of sediment above and below the lock, and to obtain material for gravelling the dam.

Lock No. 3.—There was not much work done that could properly be placed under the head of repairs at this lock during the season, excepting the ordinary light repairs to gates, machinery, irons, &c. The dwelling house was painted and the lot enclosed with a new fence. A new office was placed on land fronting the lock and the small office removed from No. 1 and placed on the middle wall. Some sheeting was placed on the upper slope of the dam near to the abutment, and stone was put in the cribs on the lower slope. Some work was done on the ice breaker and the dam was gravelled.

Lock No. 4.—A new gate was built and placed in the lower end of the land wall. Some stone was put in the dam and new sheeting on its lower slope. Coffer dams were put above and below the lock and the lock chamber was pumped out, some new floor was laid in the bottom of the lock; also a new mitresill for the upper gates and the steps adjusted under all the gates. The head wall was supported and one hundred barrels of cement grout was run under the outside wall and floor. Some new wickets were put in the upper gates and the irons repaired.

Lock No. 5.—The chief outlay at this place was incurred in protecting the abutment of the dam, rendered necessary by the danger of water working around the abutment in consequence of the decayed condition of timber, and by the increased danger from the height of the dam. A coffer dam was built, commencing at the comb of the dam and connecting with the shore above; an excavation being made of sufficient depth below the surface of the water in the upper pool. All leaks around the abutments were stopped and new sheeting was put on, all well filled with gravel and protected with a crib outside. Necessary repairs were made on the dam, the ice breaker was renewed from low water up, and a new stable and oil and tool house were erected.

Lock No. 6.—This dam was threatened with destruction owing to injury received during a freshet on the 24th of December, 1883, over one hundred feet in length of the lower sheeting having been torn loose; but, fortunately, during the cold weather in January the water was low enough to admit of its being fastened down temporarily so as to save the dam until a permanent repair was made during the summer.

Owing to the undermining and washing out of stone at the eastern end of the dam, a crib was built, 20 by 60 feet, and sunk where the water was 23 feet deep, in order to strengthen and hold stone in the dam: it was filled with stone and sheeted over. During the heavy break-up of ice in the winter the ice breaker was upset and torn away. To enable boats to approach the lock with safety until a new one could be built, a row of piles were driven some distance above, which were all fastened together, and the whole connected to a pier or crib built at the upper end which formed an addition to the length of the ice breaker when it was rebuilt.

It became necessary to coffer dam above and below the lock and pump out the lock chamber in order to put a new mitresill in the lower end, and repair the breast wall and put in new wickets at the upper end.

Lock No. 7.—It was necessary to make some change in the castings under the gates at the bottom of the quoins and the steps or pivots on which the gates rested and swung; and heavier chains and sheaves were provided for working the upper wickets. In order to protect the bank below the abutment of the dam, a crib 50 feet long, with a wing running into the shore, was built and filled with stone, to resist the action of the strong current of water at that point. The channel below the lock was improved by dredging as was the case at all the lower locks. The material thus removed was placed on the dam.

In addition to the ordinary repairs as noted above, a large amount of new work has been done by the repair force during the season. At No. 3 long retaining cribs above and below the new lock; entering cribs above and below the middle wall; work on the iron lock gates; laying pipes, and work on the machinery. At No. 4 a permanent set of abutments were built to create a harbor for mooring the company's crafts during a freeze-up in winter, and improvements were made on the yard for building lock gates and depot for supplies of all kinds used on the improvement. Some time and labor was spent in the completion of Dam No. 7. Work on the new repair boat, and more or less work of this class at different points on the river. Lumber has been provided for three new lock gates, which will be built during the winter, to be placed in locks Nos. 5 and 6.

Respectfully submitted,

THOS. McGOWAN, *Supt. Repairs.*

January 1st, 1885.

REPORT OF CARGO INSPECTOR.

STATEMENT OF THE BUSINESS

ON THE

Monongahela Slackwater during the year ending December 31, 1884.

RECEIPTS FROM	TOTAL.
Coal and Slack,	$137,514.47
Coke,	2,995,31
Freight, Empty Crafts, Steamboats, Timber, &c.	62,758.94
Passengers,	3,934.25
Total,	$207,202.97

RECEIPTS AT THE SEVERAL LOCKS.

Lock No. 1,	$44,482.03
" 2,	71,805.67
" 3,	37,341.15
" 4,	48,155.14
" 5,	1,412.90
" 6,	4,006.08
Total,	$207,202.97

TRADE OF POOL NO. 1.

Tow Boats,	2,874
Crafts,	5,739
Total,	8,613

Number of Clearances Issued Eastward,	2,236
" " " Westward,	5,551
Total Number of Clearances issued in 1884,	7,787

COMPARATIVE STATEMENT OF TOLL RECEIPTS FOR THE YEARS 1883 AND 1884.

	Coal.	Coke.	Freight.	Passengers.	Total.
Tolls for 1883,	$186,063.94	$4,551.28	$84,293.14	$4,112.20	$279,023.56
Tolls for 1884,	137,514.47	2,995.31	62,758.94	3,934.25	207,202.97
Decrease for 1884,	$48.549.47	$1,558.97	$21,534.20	$177.95	$71,820.59

STATEMENT

OF

Freight Shipped East and West on the Monongahela Slackwater during the Year ending December 31, 1884.

Eastward.		Westward.	
Whiskey, bbls.	99	Sand, bushels,	679,000
Lumber, feet,	6,853,047	Whiskey, bbls.	6,680
Timber, "	1,827,420	Stone, perches,	15,317
Pig Iron, tons,	17	Posts, number,	255
Pit Posts, number,	219,200	Sheep, "	5,388
Sheep, ‘	289	Oil, bbls.	52
Horses and Cattle, number,	289	Lumber, feet,	289,400
Iron Ore, tons,	20,840	Timber, "	261,320
Stone, perches,	2,127	Steel Rails, tons,	23,844
Railroad Ties, number,	16,759	Hogs, number,	3,381
Fire Clay, tons,	2,140	Horses and Cattle, number,	289
Classified Freight, lbs.	21,085,391	Classified Freight, lbs.	6,694,600
Brick, number,	652,126		

PASSENGER RETURNS

OF THE

Several Boats Navigating the Monongahela River in 1884.

Boats.	Passengers.		No. of Locks.	Davidson's.	Geneva.	Total.
	Through.	Way.				
Germania,	2,025	4,515	9,428	1,139	1,675	$1,100.85
James G. Blaine,	2,419	4,368	9,001	1,285	1,969	1,195.00
Geneva,	2,408	4,255	8,605	1,197	1,786	1,150.30
Elizabeth,		4,841	7,268			363.40
Sentinel,		1,400	1,768			88.40
W. R. Jones,		610	726			36.30
Total,	6,852	20,019	36,796	3,621	5,430	$3,931.25

Passenger Business for 1883 and 1884 Compared.

	1883.	1884.	Difference.
Through, Davidson's & Geneva Pass'grs	19,043	15,903	3,140 decrease.
Way Passengers,	18,137	20,019	1,882 increase.
Total,	37,180	35,922	1,258 decrease.
Tolls on Through Passengers,	$2,456.65	$2,094.45	$362,20 decrease.
" Way Passengers,	1,655.55	1,839.80	184.25 increase.
Total,	$4,112.20	$3,934.25	$177.95 decrease.

Comparative Receipts in 1883 and 1884.

MONTHS.	1883.	1884.
January,	12,797.39	5,366.24
February,	22,851.82	15,806 04
March,	33,122.46	34,103.65
April,	36,651.49	43,395.32
May,	32,966.96	21,246.99
June,	28,469.59	13,877.46
July,	14,593.51	13,531.81
August,	12,077.71	6,231.66
September,	5,851.13	4,791.04
October,	25,313.91	4,997.44
November,	31,627.64	18,896.37
December,	22,699.95	24,958.95
Total,	$279,023.56	$207,202.97

STATEMENT

In Bushels of Coal and Slack Shipped from the several Pools of the Monongahela Slackwater during 1884.

Months.	Pool No. 1.	Pool No. 2.	Pool No. 3.	Pool No. 4.	Pool No. 5.	Total.
January, ...	846.500	552,500	455,000	35,400		1,889,400
February,	561,000	4,205,000	407,800	1,357,200		6,534,000
March, ...	1,886,000	7,258,500	2,540,000	3,380,400		15,064,900
April,	2,059,000	7,824,500	4,123,200	4,063,700		18,070,400
May, ...	1,284,000	1,981,500	2,168,200	1,594,700	2,500	7,033,900
June,	674,500	2,134,500	923,000	1,030,700	8,500	4,771,200
July, ...	537,000	493,500	832,400	1,432,400		3,295,300
August,	517,000	173,000	218,100	636,900	18,000	1,563,000
September,	72,000	108,000	316,300	485,900		982,200
October, ...	87,000	22,500	437.600	589,200		1,136,300
November,	236,200	1,385,000	2,936,700	2,812,500		7,370,400
December,	1,718,900	5,076,500	2,260,900	2,501,800		11,558,100
Total,	10,482,100	31,218,000	17,619,200	19,920,800	29,000	79,269,100

Coke Business for 1884.

Bushels from Pool No. 1.	192,752	$369,56
" " " 2, ...	1,945,000	2,625.75
Total number bushels Coke, ...	2,437,752	$2,995.31
Bushels Coal, ...	79,269,100	$137,514.47
" Coke, ...	2,437,752	2,995.31
Total, ...	81,706,852	$140,509.78

Comparison of the Coal and Coke Business for 1883 and 1884.

	1883.	1884.	
Total number of bushels, ...	112,395,389	81,706.852	30,688,537 decrease.
Total tolls on Coal and Coke,	$190,618.22	$140,509.78	$50,108.41 decrease.

I certify the foregoing to be correct.

W. P. WOOD,
Cargo Inspector.

JANUARY 7, 1885.

Office Monongahela Navigation Company.

REPORT OF TREASURER MONONGAHELA NAVIGATION CO.

BALANCE SHEET, JANUARY 8, 1885.

DR.			*CR.*	
Construction, old,	1,120,100.20		Capital Stock,	$1,063,750.00
" new,	453,177.36	1,573,277.56	Scrip, (convertible into Stock),	1,981.00
Cash,		4,252.62	First Mortgage Bonds, outstanding,	37,000.00
Toll Bills, (uncollected tolls)		34,127.52	Second Mortgage Bonds, outstanding,	343,000.00
Securities held for Conting't and Sinking Funds,			Undistributed Stock Account,	105,736.00
cost,		88,605.00	Sinking Funds, (for payment of bonds),	38,000.00
W. P. Wood, Cargo Inspector,		7,170,36	Contingent Fund,	50,000.00
Repair Boat,		6,393.13	Trustee Account,	7,157,67
			Suspended Account,	1,392.90
			State Treasurer,	6,546.15
			Dividends unpaid,	693.00
			Coupons unpaid.	8,560.00
			Bills Payable,	10,000.00
			Profit and Loss, balance January 8, 1885,	40,009.47
		1,713,826.19		1,713,826.19

I certify the foregoing to be correct.

W. BAKEWELL,
Treasurer,

Pittsburgh, January 8th, 1885.

OFFICE MONONGAHELA NAVIGATION COMPANY.

REPORT OF TREASURER MONONGAHELA NAVIGATION CO.

PROFIT AND LOSS FOR YEAR ENDING JANUARY 7, 1885.

DR.		CR.	
Expenses, ...	44,655.95	Balance, January 10, 1884, ...	135,893.49
Repairs, ...	55,683.24	Tolls, received and earned during year,	207,202.97
Tax on Capital Stock for 1884, ...	6,027.90	Interest received on Securities, ...	1,100.00
Tax on Gross Receipts for 1884, ...	1,635.90	Received for use of Pumping Boat, ...	965.00
Interest, Coupons on Bonds of Company, ...	16,830.00		
Undistributed Stock Account, ...	59,736·00		
Premium on Bonds Purchased, ...	25.00		
Dividend No. 58, January, 1884, cash, ...	60,279.00		
Dividend No. 59, July, 1884, Stock and Scrip,	60,279.00		
Balance, January 7, 1885, ...	40,009.47		
	345,161.46		345,161.46

I certify the foregoing to be correct.

PITTSBURGH, January 8, 1885.

W. BAKEWELL,
Treasurer.

OFFICE MONONGAHELA NAVIGATION COMPANY.

REPORT OF TREASURER MONONGAHELA NAVIGATION CO.

ABSTRACT OF CASH ACCOUNT FOR YEAR ENDING JANUARY 7, 1885.

DR. RECEIPTS.		*CR.* DISBURSEMENTS.	
Cash balance January 10, 1884, ...	82,574.34	New Construction, ...	96,547.66
Tolls, received in Cash, ...	60,652.90	Dividends Paid, ...	60,798.00
Received on Toll Bills, ...	131,834 33	State Taxes, ...	7,145.55
Bills Payable, ...	10,000,00	W. P. Wood, Cargo Inspector, for paym't of bills,	5,550.02
Interest on Securities, ...	1,100.00	Expenses, ...	44,655.95
Use of Pumping Boat, ...	965.00	Repairs, ...	55,683.64
		Repair Boat, ...	6,393.13
		Bonds Purchased and Premium, ...	1,025.00
		Coupons Paid, ...	17,075.00
		Balance, Cash in Banks, ...	4,252.62
	299,126.57		299,126.57

I certify the foregoing to be correct.

PITTSBURGH, January 8, 1885.

W. BAKEWELL,
Treasurer.

OFFICE MONONGAHELA NAVIGATION COMPANY.

REPORT OF TREASURER MONONGAHELA NAVIGATION CO.

STATEMENT OF BONDS AND NEW CONSTRUCTION.

DR.		*CR.*	
First Mortgage Bonds Issued, ...	19,000.00	Paid on New Lock No. 3, ...	213,459.95
Second Mortgage Bonds, ...	371,000.00	" Lock and Dam No. 7, ...	161,082,73
Premium on Sale of Bonds, ...	5,020.00	" Chute in Dam No. 1, ...	26,115 71
Cash expended, for which Bonds are to be Issued, ...	58,157.36	" for Engineering Expenses, ...	10,137.83
		" other New Construction, ...	42,381.11
	453.177.36		453,177.36

I certify the foregoing to be correct.

W. BAKEWELL,
Treasurer.

PITTSBURGH, January 8, 1885.

ANNUAL MEETING OF STOCKHOLDERS.

Pittsburg, January 8, 1885.

Pursuant to public notice, the Annual Meeting of the Stockholders of the Monongahela Navigation Company was held this day, being the second Thursday of January, 1885, at the office of the company, No. 104 Grant Street, Pittsburg, at 2 o'clock P. M.

On motion of Mr. M. K. Moorhead, Mr. R. Marshall was elected Chairman of the meeting.

On motion of Mr. W. Bakewell, Mr. James I. Kay was chosen Secretary of the meeting.

The Secretary read the Minutes of the last Annual Meeting, which, on motion, were approved.

The Annual Report of the Board of Managers, and of the Treasurer, Cargo Inspector, and Superintendant of Repairs were presented to the meeting.

It was moved and carried that the reading of the reports be dispensed with, and that the incoming Board of Managers be instructed to have those reports printed in pamphlet form for distribution to the Stockholders.

On motion of Mr. W. J. Moorhead, Mr. J. B. Sneathen was chosen Judge of the election of officers and managers.

On motion of Mr. Brunot, Messrs. W. J. Moorhead and James I. Kay were elected Tellers.

The election was held by ballot, and when the hour of four o'clock had arrived, Mr. John Harper moved that the polls close, and that the tellers proceed to count the vote.

The tellers reported that by an unanimous vote the officers and managers for the ensuing year had been elected as follows: each having received 13,514 votes. President, M. K. Moorhead; Secretary and Treasurer, Wm. Bakewell; Managers—Joseph Albree, Alexander Bradley, Felix R. Brunot, A. C. Bakewell, John Harper, George B. Logan, J. B. Murdoch, M. D., J. B. Moorhead, A. E. W. Painter and J. B. Sweitzer.

On motion of Dr. Murdoch, the report of the tellers was accepted.

On motion, the meeting then adjourned.

ROBT. MARSHALL,
Chairman.

JAS. I. KAY,
Secretary.

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